

* GET OUT 2 THINGS:

- Notes from Friday (10.1 notes)
- Notes from Thursday (10.2 notes)

* Have the 2 HW problems (from 10.1 notes) open & on your desk

* Start working on problems #3 & 4 from the 10.2 notes (thursdays). They are at the end of the packet. They are your warm up.

ANSWERS TO HW:

1) b. party affiliation

c. support for balanced budget

d. 9

e. $P(D) = 250/500 = 50\%$

f. $P(F \text{ and } R) = 125/500 = 25\%$

g. $P(R|F) = 125/190 = 65.79\%$

h. $P(N|I) = 25/50 = 50\%$

i. $P(D|A) = 150/210 = 71.43\%$

j. $P(I|N) = 25/100 = 25\%$

k. $P(D \text{ and } N) = 50/500 = 10\%$

- 2) a. survival
b. hospital
c. 4

d. $P(A) = 2100/2900 = 72.41\%$

e. $P(B) = 800/2900 = 27.59\%$

f. $P(D) = 79/2900 = 2.72\%$

g. $P(S) = 2821/2900 = 97.28\%$

h. $P(D|A) = 63/2100 = 3\%$

i. $P(D|B) = 16/800 = 2\%$

j. $P(B \text{ and } D) = 16/2900 = 0.552\%$

k. $P(A \text{ and } D) = 63/2900 = 2.17\%$

row = college location
column = gender

association college loc. & gender

- Compare observed cell counts to expected cell counts.
- If.... there is no association the observed cell counts will be close to expected.

- Use χ^2 test for association

$$\text{Expected:} = \frac{(\text{row total}) \times (\text{column total})}{n}$$


	F	M	
In	$\frac{38 \times 26}{65}$ 15.2	$\frac{38 \times 39}{65}$ 22.8	38
Out	10.8	16.2	27
	26	39	65

χ^2 for assoc.

- Want to test if there is an association btw row & column variables

Hypotheses:

H_0 : there is no association
btw. row var. and column var.



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graph TD; A[fill in names] --> B[row var.]; A --> C[column var.];
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H_a : there is an assoc. btw.
row var. & column var.

- no association = independent

- $\chi^2 = \sum \frac{(\text{obs} - \text{exp})^2}{\text{exp}}$

- Compare matching obs. & exp. cell counts.

P-VALUE

- $P(\chi^2 > \text{test stat.}) = \chi^2 \text{cdf}(\text{test stat.}, \alpha, \text{df})$

- $\text{df} = (\underset{\substack{\uparrow \\ \text{\# rows}}}{r} - 1) \cdot (\underset{\substack{\uparrow \\ \text{\# columns}}}{c} - 1)$

CONCL:

- Same 2 sentences
 - reject/fail to reject H_0
 - We have suff. evid....
(re-copy H_0/H_a)

Conditions

- 2 independent SRS
- all exp. cell counts ≥ 5

$H_0:$

$H_a:$

$$\chi^2 = \sum \frac{(\text{obs} - \text{exp})^2}{\text{exp}} = 87.17$$

$$P(\chi^2 > 87.17) = 9.95 \times 10^{-21}$$

① H_0 : there is no association btw.
defective parts & weekday.
* defective parts & weekday
are independent

H_a : there is an association btw.
defective parts & weekday
* def. parts & weekday are dependent

$$\chi^2 = \sum \frac{(\text{obs} - \text{exp})^2}{\text{exp}} = 8.55$$

$$P(\chi^2 > 8.55) = 0.073$$

- We fail to reject H_0 b/c p-value $> \alpha = 0.05$
- We have suff. evid that (re-copy H_0).

② H_0 : type of irritation and age are indep.

H_a : type of irritation and age are dependent.

$$\chi^2 = \sum \frac{(\text{obs} - \text{exp})^2}{\text{exp}} = 13.619$$

$$P(\chi^2 > 13.619) = 0.0342 \quad \alpha = 0.05$$

$$df = 6$$

- We reject H_0 b/c p-value $< \alpha = 0.05$.
- We have suff. evid that irritation & age are dependent.